



Best Practice Initiative

from the Assistant Secretary for Health
U.S. Department of Health and Human Services



Hypertension Initiative of South Carolina

(South Carolina, 2004)

Accomplishments

- Established a program for voluntary dynamic multi-site medical record auditing with provision of feedback to participating primary care providers to increase physician awareness of and compliance with hypertension clinical practice guidelines.
- Enrolled over 300 primary care physicians from about 70 sites across South Carolina.
- Developed unique computer programs to remotely download and merge data from a wide array of Electronic Medical Record (EMR) systems.
- Established a care management database representing more than 79,000 non-duplicated individuals with hypertension.
- Facilitated certification of 47 primary care providers as Hypertension Specialists in collaboration with the American Society of Hypertension (ASH).
- Performed science-based population subset analyses to examine potential age, gender and race disparities in guidelines-based:
 1. preventive screening (detection)
 2. evaluation and treatment, and
 3. cardiovascular (CV) risk factor control

Introduction

Hypertension is a major contributing factor to health disparities. Hypertensive patients are at higher risk for lipid disorders, diabetes, myocardial infarction, heart failure, and end-stage renal disease than their normotensive counterparts.

The U.S. population is aging, and becoming more obese and ethnically diverse which are all associated with greater prevalence of hypertension and cardiovascular complications. These demographic shifts will accelerate a trend toward increased coronary morbidity and mortality unless large-scale, proactive measures are taken. Furthermore, the economic benefits of controlling CV risk factors for both patients and the health care system are well established and underscore the importance of reducing CHD.

The hypertensive population in the Southeast has more co-morbid conditions and worse outcomes than similar populations in other regions. The extent of hypertension-related conditions among South Carolinians is highlighted when one considers that 45% of the Hypertension Initiative database population meets JNC VI criteria for risk group 'C' compared with 19% in a previous nationally representative study (NHANES).

There is sparse research comparing real-world practice patterns for treatment and outcomes from multiple primary care sites. Although a few studies have compared treatment and outcomes by patient demographics, there are almost none further stratifying these variables by provider characteristics. Additionally, it is important to investigate populations with specific co-morbid conditions due to the necessity of balancing complex regimens when determining optimal treatment.

Evidence suggests primary care providers have a major impact on blood pressure control rates and associated cardiovascular risk factors among their patients. However, many providers are unfamiliar with treatment guidelines and/or are reluctant to titrate and add medications, even when BP is poorly controlled. Efforts to focus clinicians on treatment guidelines, evidence-based practices, and individualized management can improve outcomes and reduce disparities. It has been previously demonstrated that a dynamic medical record auditing program with effective feedback can enhance control rates by increasing physician awareness of and compliance with treatment guidelines. Launched in 1999, the Hypertension Initiative is such a program.

Goals and Objectives

The principal, long-term goal of the Hypertension Initiative is to facilitate the transition of South Carolina from a leader in cardiovascular deaths to a model of cardiovascular health – taking South Carolinians from “worst to first”.

The initial, short-term goal is to improve blood pressure control rates from the current level of ~30% of all hypertensives to ~50% (Healthy People 2010). Because so many people with high blood pressure are untreated, this goal can best be met by reaching 70% control rates among those already on treatment.

In the next year, our focus is to gain optimal control among treated patients who are close to goal. We believe this is possible as about half of treated patients are controlled to <140/90 and another 20% are <150/90.

Attaining 70% control rates in treated patients will move South Carolina to the goal of 50% control among all people with hypertension. The Hypertension Initiative invites primary care physicians to track their treatment patterns and patient outcomes through the Initiative’s database and feedback reporting system. The Initiative also encourages and supports primary care physicians to become Hypertension Specialists through the American Society for Hypertension’s (ASH) certification process.

Primary care providers in the Southeast voluntarily participate in quarterly medical record audits by Electronic Medical Record (EMR) downloads (~80%) or collection of paper reporting cards (~20%). Providers receive quarterly feedback reports summarizing medications and lab values for all of their own hypertensive patients with comparisons to hypertensive patients in similar type sites and in the database overall. CME programs are offered across participating areas designed to raise awareness of treatment and outcome patterns, encourage evidence-based practice, and support primary care physicians pursuing accreditation as ASH Hypertension Specialists.

All data monitoring and review procedures were approved by the Office for Research Protection and Integrity (ORPI) at the Medical University of South Carolina (MUSC) to ensure appropriate patient confidentiality safeguards were in place and that the study complied with the Health Insurance Portability and Accountability Act (HIPAA).

Results

The Hypertension Initiative database is a large (>79,000 hypertensive patients), unique, investigative tool. It is comprised of records from >300 primary care providers at ~70 sites allowing analysis of complicated populations with sufficient sample size for reliable calculations.

Most sites use EMR and data downloads are conducted remotely. However, ~20% of participating providers do not use EMRs and fill out and return paper report cards at each hypertensive patient visit (~25,000). The effort to incorporate this documentation into a

medical practice testifies to the value physicians place on the feedback reports they receive for participating. It is also likely that primary care physicians value participating in scientifically credible, large-scale research. To date, 47 physicians have become certified Hypertension Specialists with the encouragement and support of the Initiative.

Among the 79,129 hypertensive patients in the database, their average BP is 138/79 mmHg and 50% have a most recent value <140/90 mmHg. Thirty-one percent of hypertensives (24,443) are diabetic with an average HbA1c of 7.5%. The average hypertensive patient is receiving ~1.8 BP medications, which indicates that most clinicians have overcome resistance to combination therapy. Among hypertension patients with diabetes mellitus and/or nephropathy, antihypertensive medication use rises to a mean of ~2.8, with 75% or more receiving either an ACE inhibitor or angiotensin receptor blocker. Of note, beta-blocker use among hypertensive patients with a comorbid diagnosis of heart failure has risen steadily over the past two years and has reached more than 60%. Fifty-two percent of hypertensives are also dyslipidemic.

An analyses of 38,116 dyslipidemic hypertensives in our earlier dataset indicated that younger patients and women received less screening and treatment and experienced poorer outcomes than older patients and men both between and within racial groups (African-American (AA) versus Caucasian(C)). In this sample, there was no LDL-C value on record within the last year for 52.1% (n=19,841) of patients. Among gender and race groups, C women were most likely not to have an annual LDL-C measurement (57%), followed by C males (46.8%), AA males (45.2%), and AA women (43.2%). When stratified by age and compared by racial group, over half of patients in the youngest group (<40 years old) of each race had no LDL-C measurement within the last year. For both C and AA patients, those in the youngest age group (<40 years old) were less likely to have an annual LDL-C compared to older, same race patients (C $p<0.0001$ and AA $p<0.001$).

Among patients 40-60 years old, 44% of AA and 50% of C had no annual LDL-C measurement. This finding is disturbing in light of the well-established opportunity to prevent serious CV events by controlling BP and lipids over the life span.

Another analysis of the Hypertension Initiative database indicated that first-line treatments (such as statins) were underused in certain hypertensive populations and that these populations were also more likely to be completely untreated. Among the ~38,000 dyslipidemic hypertensives reviewed, 34.2% (n=13,026) were not on any anti-lipidemic medication. Of those on therapy, 58.2% (n= 22,175) were prescribed a statin, 7.6% (n=2,915) were prescribed a non-statin agent, and 14.7% (n=5,600) received both a statin and a non-statin (combination therapy). Women were less likely to receive statins than men (47.7% vs. 65.1%, $p<0.0001$) and fewer C than AA women were prescribed these agents (43.6% vs. 52.6%, $p<0.0001$). The gender difference was significant ($p<0.0001$) when proportions of pre-menopausal women (<45 years old) on statin (26.1%) and post-menopausal women (>45 years old) on statin (50.8%) were compared to the proportion of men on statins (63.4%).

The percentage of untreated dyslipidemic patients was similar in both racial groups but women were more likely than men not to receive any lipid-lowering medication (44.3% vs. 28.9%, $p<0.0001$). Stratification by age showed 58.4% of the youngest hyperlipidemic patients (<40 years old) and 40.1% of those <60 years old had not been prescribed any lipid-lowering medication. For both C and AA patients, those in the youngest age group (<40 years old) were less likely to be treated compared to same-race patients in older age groups (C $p<0.0001$ and AA $p<0.0001$).

Age group differences persisted when various treatments were compared. In both racial groups, fewer of the youngest patients (<40 years old) were prescribed a statin

(C $p < 0.0001$ and AA $p < 0.0001$) or combination therapy compared to older, same-race counterparts (C $p < 0.0001$ and AA $p < 0.0001$). Further investigation is important since, in both racial groups, fewer of the youngest patients (<40 years old) had attained cholesterol control at either the <130 mg/dL (C $p < 0.0001$ and AA $p < 0.001$) or the <100 mg/dL level (C $p < 0.0001$ and AA $p < 0.0001$) compared to older, same-race counterparts.

Another recent analysis of angina prevalence among hypertensive patients in the database (N=78,000) found: 9,652 (12.3%) had a diagnosis of intermediate coronary syndrome (1,500), angina pectoris (1,743), or chest pain (6,409). The majority were men (81%) compared to women (19%). Male and female groups had similar age group distributions. Caucasians comprised a greater proportion (68%) than African Americans (32%) and age group distributions between racial groups were similar.

The most common diagnosis was chest pain, followed by angina and intermediate coronary syndrome (ICS). Significantly ($p < 0.05$) more men than women were diagnosed with ICS (16.8% vs. 9.3%) and angina (21.1% vs. 8.7%). However, significantly ($p < 0.0001$) more women were diagnosed with chest pain (61.9 % vs. 86%).

For all three conditions, significantly more Caucasian than African-American men were diagnosed with intermediate coronary syndrome (19.1% vs. 13.2%, $p < 0.0001$) and angina (22.6% vs. 18.3%, $p < 0.05$). The more vague diagnosis of “chest pain” was significantly more common among women and AA. Among women, more AA were diagnosed with ICS (10.3% vs. 6.9%, $p < 0.05$) and more C women were diagnosed with angina (6.4% vs. 3.0%, $p < 0.0001$).

Treatments differed between race, gender, and age groups. Across all age groups, men received more angiotensin-converting enzyme inhibitors (ACE-I), beta blockers (BB), alpha/beta blockers (A/BB), statins, and nitrate/vasodilators (N/V) than women. Women in all age groups received more diuretics and angiotensin receptor blockers (ARB) than men.

African-Americans received more ACE-I than C in all age groups with significant ($p < 0.0001$) differences found in patients 65-80 years old. However, AA generally received fewer prescriptions for ARB with significantly ($p < 0.05$) fewer in AA patients under 45 years old. Caucasians received more BB and those 45-65 years old received significantly ($p < 0.0001$) more. Alpha/Beta blockers were more often prescribed to AA than to C and significantly ($p < 0.0001$) more often among those 45-80 years old. Calcium channel blockers were prescribed more often to AA than to C especially in younger patients. African-Americans also received significantly more diuretics in all age groups than C.

Statins were prescribed more often to C in all age groups except one: AA patients 45-65 years old received more statins. Finally, nitrates and vasodilators were more often used to treat C than AA especially in the youngest age groups.

Overall, in these analyses, majority sub-groups (C and men) experienced better cardiovascular risk factor control than minority sub-groups (AA and women). Across all age groups, C patients had better control of cardiovascular risk factors (blood pressure, hemoglobin A₁C, and cholesterol) than AA patients. Gender comparisons found men had better BP control than women in all age groups. While men and women <45 years old had similar LDL-C control, men >45 years old had significantly ($p < 0.05$) better control than women. Men and women <65 years old had similar rates of HbA₁C control but older men (>65) had significantly ($p < 0.05$) better control than women.

Future

A central purpose of the Hypertension Initiative is to regularly analyze and report findings from the database in order to continue building credibility and value with

participants by ensuring our collective efforts are rendered useful to the larger scientific community.

The Hypertension Initiative database has been active for over three years and continues to add new practices, most recently, several Veteran's Medical Centers. Anticipated additions will increase the number of Hispanic patients in the database. It is expected that numbers of Hispanic patients will be sufficient for analysis as a separate ethnic group within six months.

The database has been active long enough to ensure major barriers to data collection, management, and analysis have been resolved. In the past three years, no participant has asked to be removed. Informal, anecdotal response from participants continues to be positive and new practitioners continue to be added to the database.

As more sites join, more extensive analyses can be carried out and disseminated. Further investigation is planned to: illuminate possible confounders, clarify interpretation of findings, and determine whether provider and site characteristics impact patient outcomes. Geo-coded mapping is also planned to track diagnoses, treatment patterns, ER use, hospitalizations, and cardiovascular risk factor trends.

That physicians value participation portends a receptive audience for CME sessions and other interventions arising from the project as well as increased overall participation as new practitioners become aware of the site-specific support and broader benefits the Hypertension Initiative offers.

References

1. Basile, J.N., et al., *A statewide primary care approach to cardiovascular risk factor control in high-risk diabetic and non-diabetic patients with hypertension*. Journal of Clinical Hypertension, 2004. 1(1).
2. Egan, B.M., D.T. Lackland, and J.N. Basile, *American Society of Hypertension regional chapters: Leveraging the impact of the clinical hypertension specialist in the local community*. American Journal of Hypertension, 2002. 15: p. 372-379.
3. Egan, B.M. and D.T. Lackland, *Strategies of prevention and the importance of public health and community programs*. Ethnicity & Disease, 1998. 8: p. 143-154.
4. Hendrix, K.H., D.T. Lackland, and B.M. Egan, *Cardiovascular Risk Factor Control and Treatment Patterns in Primary Care*. Managed Care Interface, 2003. 16(11): p. 21-26.
5. Hendrix, K.H., J.E. Riehle, and B.M. Egan, *Ethnic, gender, and age related differences in treatment and control of dyslipidemia in hypertensive patients*. Ethnicity & Disease, 2004. (in press).

Additional Information

Katharine H. Hendrix, PhD
Medical University of South Carolina
Hypertension Initiative
96 Jonathan Lucas Street
826 CSB
Charleston, SC 29425
hendrikh@musc.edu
843-792-1715 or 843-792-6340